

# Environmental Assessment SCA Chemical Services Company Hazardous Waste Management Facility Chicago/Lake Calumet

**Prepared for:**

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**SECTION IV**  
**DESCRIPTION OF THE PROPOSED PROJECT AREA**

**A. Description of the Physical Environment**

**1. Geology and Soils**

The facility site was formerly covered by the waters of Lake Calumet. As such, the uppermost natural deposits at the site are lacustrine in nature. Underlying the man-made deposits of uncompacted earth materials is an organic marsh layer, formed after lake levels receded during the Pleistocene Age. Underlying the organic layer is the Equality Formation, the former lake bottom, a layer of lacustrine sand less than 20 feet thick.

Glacial till, the Wadsworth member of the Wedron Formation, bottom sediment of the glacial Lake Chicago (which was present earlier in the Pleistocene), is the next geologic formation encountered. The till is a gray, calcareous, clayey and silty clay till comparatively low in pebbles, cobbles, and boulders. Occasional thin silt lenses are present in the formation.

Soil borings at the facility site were taken October 9, 1980 by Raymond International, Inc. (see Appendix B). The fill at the site was found to be a mixture of slag, silt, clay, stones, and rubble seven to eighteen feet in

thickness. The pH was high, ranging from 7.5 to 11.8 in some areas, due most likely to the nature of the wastes deposited. Medium dense to dense silt mixed with organics was found underlying the fill. Below this silt layer, stiff to hard gray silty clay, with isolated layers of silt, was found. The borings were terminated in this clay layer, 30 to 60 feet below the ground surface. The lacustrine sand layer common in the area usually encountered at a depth of five to fifteen feet was not found in any of the soil borings taken at the site.

Below the glacial till, dolomite initially deposited as limestone on the bottom of a shallow sea is encountered. This dolomite is found at a depth ranging from approximately 70 to 110 feet. This system, deposited during the Silurian period, ranges from pure dolomite to dolomite that is argillaceous, silty, and cherty. The maximum thickness of the dolomite in the Lake Calumet area is 500 feet.

An Ordovician system 700 to 1,000 feet in thickness, comprised of three series, underlies the Silurian dolomite. The uppermost series, the Maquoketa Group, is an impermeable layer of mainly shale and limestone. The middle series, the Champlain series, is largely lime-

stone and dolomite with a base of sandstone. The lower series, the Canadian series, is predominately dolomite but contains some sandstone. This system is also a marine deposit.

The next system encountered, also a marine deposit, is the Cambrian system. Sandy dolomite, sandstone, and siltstone make up the upper portion of the system. The lower portion consists mainly of sandstone.

Underlying all of these lake and sea deposits is a Pre-Cambrian igneous granite formation. This granite should be encountered at a depth of approximately 4,000 to 5,000 feet at the facility site.

## 2. Topography

The land area around the facility site is low, marshy, and flat. Uncompacted fill has made the site approximately four feet above the level of Lake Calumet. Slips have been constructed from the lake into the site. The elevation of the area is approximately 585 feet above sea level.

## 3. Climate

The climate of the Chicago area is continental, modified somewhat by the influence of Lake Michigan. There are strong changes from season to season. During the summer high temperature and high humidity may make conditions

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The climate of the Chicago area is continental, modified somewhat by the influence of Lake Michigan. There are strong changes from season to season. During the summer high temperature and high humidity may make conditions

oppressive. In the winter, very low temperature and considerable cloudiness occur. Approximately half of the precipitation in the winter falls as snow. This amounts to an average of 39 inches of snow each year. Total precipitation is approximately 33 inches per year. Evaporation rates are approximately 32 inches per year.

The average summer temperature in the Chicago area is 72°F; the average winter temperature is 29°F. Temperatures at the facility site will be moderated somewhat by the influence of Lake Calumet and Lake Michigan.

Local climatological data from 1978 for the Midway Airport, the NOAA station closest to the facility site, is given in Appendix C of this report.

#### 4. Air Quality

Five air sampling stations are located near the facility site (refer to Figure IV.1.):

Anthony Elementary School	9800 S. Torrence Ave.
Addams Elementary School	10810 S. Avenue H
Washington High School	3500 E. 117th Street
Carver High School	803 E. 133rd Street
Rosemont Pumping Station	351 West 104th Street

Nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), and suspended particulates are monitored at the first four

stations. Summaries of annual data from these stations are given in Table IV.1. Ozone is measured at the fifth station, the Rosemont Pumping Station. In 1978 the one-hour ozone standard was exceeded 233 times.

The Lake Calumet area has been designated by the U.S. EPA as being an attainment area for SO<sub>2</sub>. Ambient levels of SO<sub>2</sub> are less than both the primary and secondary National Ambient Air Quality Standards (NAAQS) set for protection of health and welfare. The area has been designated as a non-attainment area, however, for NO<sub>2</sub>, total suspended particulates, ozone, hydrocarbons, and carbon monoxide.

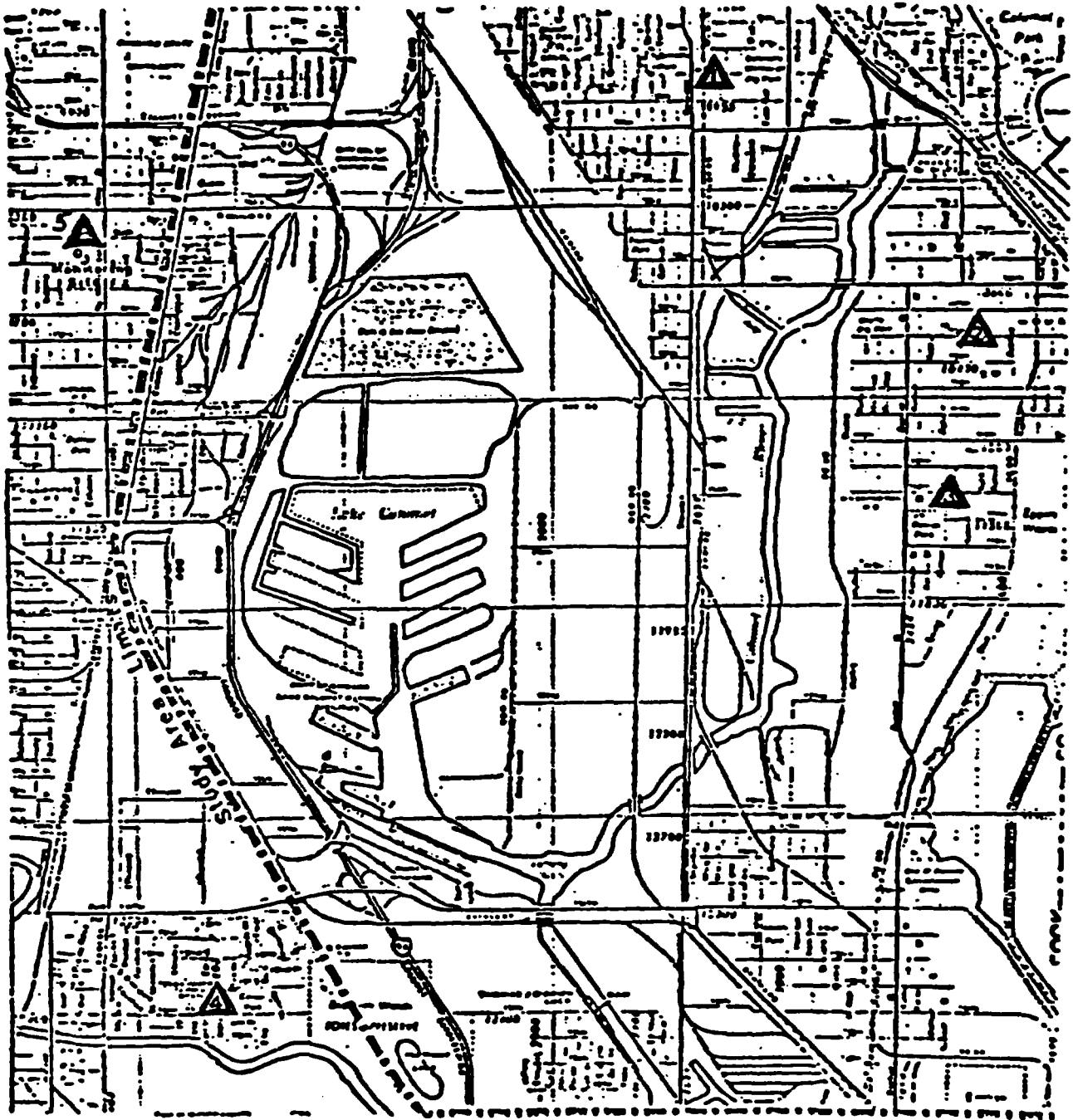
In addition, the Lake Calumet area has been designated as a Class III area by the State of Illinois under the "Prevention of Significant Deterioration" criteria. Class III areas are highly developed urban areas. Deterioration of air quality is allowed up to the NAAQS (see Table IV.2.).

Each source, however, can increase concentrations of particulate matter and sulfur dioxide only a specified amount:

	<u>mg/m<sup>3</sup></u>
Total Suspended Particulates	
Annual geometric mean	37
24-hr. maximum	75

FIGURE IV.1.

AIR SAMPLING LOCATIONS NEAR FACILITY



1. Anthony Elementary School, 9800 S. Torrence Avenue
2. Addams Elementary School, 10810 S. Avenue H.
3. Washington High School, 3500 E. 114th Street.
4. Carver High School, 803 E. 133rd Street.
5. Rosemont Pumping Station, 351 West 104th Street.

Source: EIS for Lake Calumet Harbor Area Development,  
City of Chicago, August, 1979



TABLE IV.1.

**NITROGEN DIOXIDE READINGS**  
(annual arithmetic mean)

<u>SITE</u>	<u>YEAR</u>				
	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
Anthony	0.030 ppm	0.024 ppm	0.033 ppm	0.038 ppm	0.039 ppm
Addams	0.032 ppm	0.031 ppm	0.034 ppm	0.039 ppm	0.036 ppm
Washington	0.031 ppm	0.032 ppm	0.034 ppm	0.036 ppm	0.040 ppm
Carver	0.030 ppm	0.031 ppm	0.031 ppm	0.036 ppm	0.041 ppm

**SULFUR DIOXIDE READINGS**  
(annual arithmetic mean)

<u>SITE</u>	<u>YEAR</u>				
	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
Anthony	0.003 ppm	0.006 ppm	0.009 ppm	0.009 ppm	0.009 ppm
Addams	0.021 ppm	0.016 ppm	0.015 ppm	0.013 ppm	0.009 ppm
Washington	0.022 ppm	0.013 ppm	0.011 ppm	0.010 ppm	0.007 ppm
Carver	0.013 ppm	0.008 ppm	0.010 ppm	0.008 ppm	0.008 ppm

**SUSPENDING PARTICULATE READINGS**  
(annual geometric mean)

<u>SITE</u>	<u>YEAR</u>				
	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
Anthony	95 $\mu\text{g}/\text{m}^3$	86 $\mu\text{g}/\text{m}^3$	90 $\mu\text{g}/\text{m}^3$	87 $\mu\text{g}/\text{m}^3$	88 $\mu\text{g}/\text{m}^3$
Addams	123 $\mu\text{g}/\text{m}^3$	105 $\mu\text{g}/\text{m}^3$	131 $\mu\text{g}/\text{m}^3$	119 $\mu\text{g}/\text{m}^3$	108 $\mu\text{g}/\text{m}^3$
Washington	153 $\mu\text{g}/\text{m}^3$	148 $\mu\text{g}/\text{m}^3$	175 $\mu\text{g}/\text{m}^3$	172 $\mu\text{g}/\text{m}^3$	121 $\mu\text{g}/\text{m}^3$
Carver	72 $\mu\text{g}/\text{m}^3$	73 $\mu\text{g}/\text{m}^3$	90 $\mu\text{g}/\text{m}^3$	80 $\mu\text{g}/\text{m}^3$	85 $\mu\text{g}/\text{m}^3$

TABLE IV.2.

U.S. EPA  
NATIONAL AMBIENT AIR QUALITY STANDARDS

<u>Pollutant</u>	<u>Primary Standards</u>			<u>Secondary Standards</u>		
	<u>µg/m<sup>3</sup></u>	<u>ppm</u>	<u>Averaging Time</u>	<u>µg/m<sup>3</sup></u>	<u>ppm</u>	<u>Averaging Time</u>
Sulfur Dioxide	80	0.03	aam	1300	0.50	3 hr.
	365	0.14	24 hr.			
Total Suspended Particulates	75		agm	60		agm
	260		24 hr.	150		24 hr.
Carbon Monoxide	10	9	8 hr.	10	9	8 hr.
	40	35	1 hr.	40	35	1 hr.
Photochemical Oxidants	240	0.12	1 hr.	240	0.12	1 hr.
Non-methane Hydrocarbons	160	0.24	1,2	160	0.24	3 hr. 1,2
Nitrogen Dioxide	100	0.05	aam	100	0.05	aam
Airborne Lead	1.5				N/A	

1 - Not to exceed more than once a year

2 - 6 a.m. to 9 a.m.

aam - annual arithmetic mean

agm - annual geometric mean

µg - microgram

ppm - parts per million

m<sup>3</sup> - cubic meter

	<u>mg/m<sup>3</sup></u>
Sulfur dioxide	
Annual arithmetic mean	40
24-hr. maximum	182
3-hr. maximum	700

## 5. Hydrology

Two distinct aquifer systems exist in the Lake Calumet area. The upper groundwater is contained in the fill, in the organic marsh deposits, and in the lacustrine sand deposits. This water intersects the surface in the marshy areas and ponds and is in hydraulic balance with the waters of Lake Calumet, which are in turn in hydraulic balance with the waters of Lake Michigan. Little use is made of these shallow aquifers in the Lake Calumet region.

The shallow aquifers are separated from the deeper aquifers by the impermeable clays of the glacial till layer. Groundwater does exist in the Silurian dolomite, but because of the structure's tightness, yields are quite low. Only the Ironton-Galesville Sandstone, at a depth of approximately 1,500 feet, is capable of supplying substantive yields. This water, however, has a high mineral content which makes it acceptable for use by only a few industries. Deeper aquifers are just too deep to economically develop.

The waters of Lake Calumet and the Calumet River have been designated as Secondary Contact and Indigenous Aquatic Life Waters. The designation is for waters that humans do not have direct contact with, i.e., via recreational activities, and waters not used as a public supply source. Data from a monitoring station on the Calumet River at the 130th Street Bridge showed "good or balanced" levels of fecal coliform, dissolved oxygen, dissolved solids, and ammonia nitrogen (1975 data), but high levels of lead. Also, low levels of dissolved oxygen (June 1976) have been recorded.

The City of Chicago collected additional data on October 3, 1978. Water and sediment samples were taken. Monitoring locations are shown in Figure IV.2. Data is given in Tables IV.3. and IV.4. Site #1, the Paxton Site, is very close to the facility site. In comparison with the other sampling points in the area, site #1 showed the strongest odor and the highest levels of ammonia nitrogen, iron, and phenols in the water sample and the highest levels of COD, lead, ammonia nitrogen, cadmium, and mercury in the sediment sample.

Currently, bottled water is brought into the facility for drinking water; water from Lake Calumet is used for other purposes. The public water supply system, which the facility may have access to in the near future, originates

from Lake Michigan. The water of the lake is not affected by pollutants in Lake Calumet and the Calumet River. The O'Brien Locks at the junction of the Little Calumet and Calumet Rivers have reversed the flow of water away from Lake Michigan.

## 6. Ecology

Site vegetation is quite sparse, consisting of only scattered clumps of weeds growing in the uncompacted fill. On a visit in October, 1980 no amphibians, reptiles, or mammals were located. An ecological study of the Lake Calumet area done by the City of Chicago in the Fall of 1978 reported, however, spotting the following species in the surrounding land area:

<u>Common Name</u>	<u>Species Name</u>
eastern garter snake	<u>Thamnophis sirtalis</u>
midland brown snake	<u>Storeria dekayi wrightorum</u>
plains garter snake	<u>Thamnophis radix radix</u>
midland painted turtle	<u>Chrysemys picta marginata</u>
leopard frog	<u>Rana pipiens</u>
muskrat	<u>Ondatra zekethica</u>
eastern cotton-tailed rabbit	<u>Sylvilagus floridanus</u>

The Lake Calumet region is also a stop-over point for migratory birds. There is also quite a diversity of